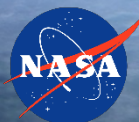


COSMIC-2 (Constellation Observing System for Meteorology, Ionosphere and Climate) Tri-GNSS Radio Occultation System (TGRS)



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Outline



- COSMIC-2 Mission Overview / JPL's Role
- COSMIC-2 – How does it work?
- Radio Occultation History
- NASA's interest in Cosmic-2
- JPL's Payload
- COSMIC-2 at launch site
- STP-2 launch
- Ground antenna stations
- Summary



COSMIC-2 Mission Overview

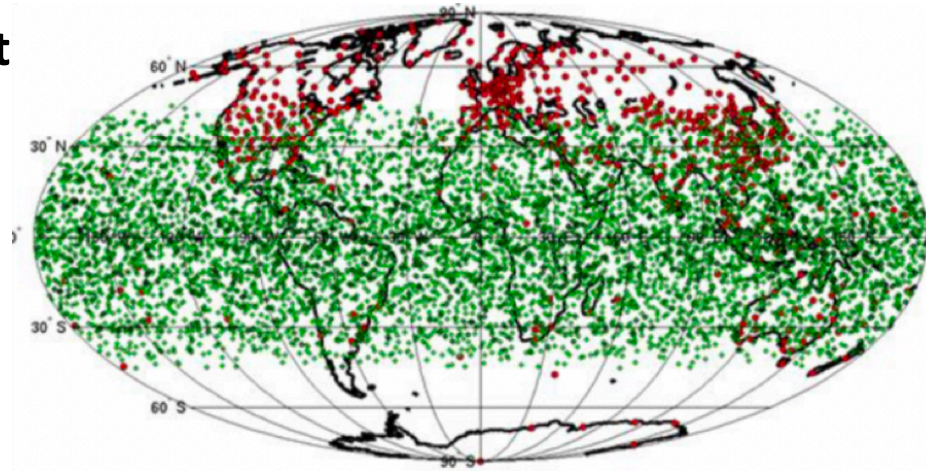
JPL's Role



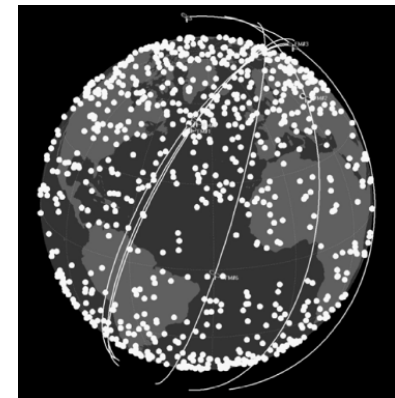
COSMIC-2 Mission Objective: Provide next generation observations for weather forecast and climate

- Constellation of six satellites
- Provides temperature, pressure and moisture at different vertical layers in Earth's atmosphere
- COSMIC-2 measurements are concentrated close to the equatorial plane
- Joint US and Taiwan mission: NOAA, USAF, UCAR, NSF, NASA/JPL, NSPO (Taiwan)
- JPL provided the primary instrument on each satellite

Tri-GNSS Radio Occultation System (TGRS)



Cosmic-2 Profiles in 24 hour period (simulated)



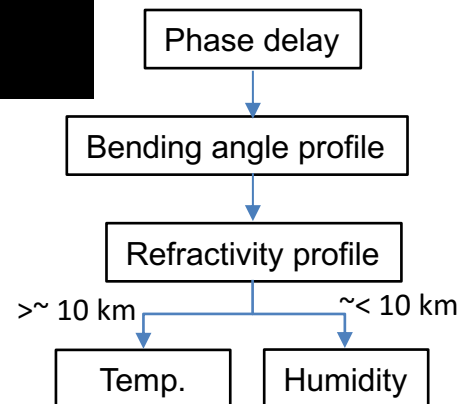
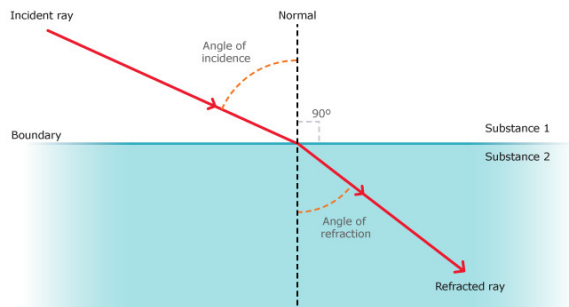
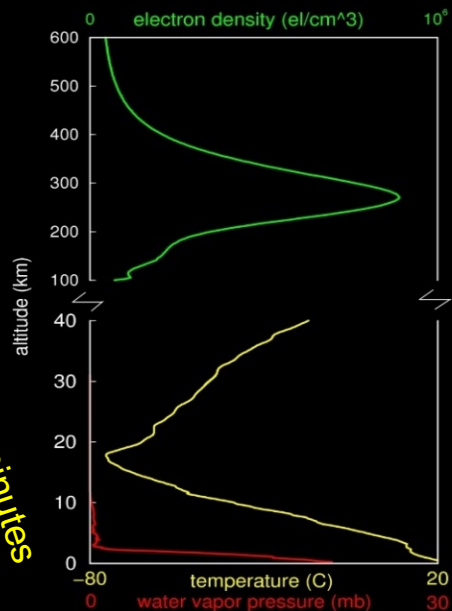
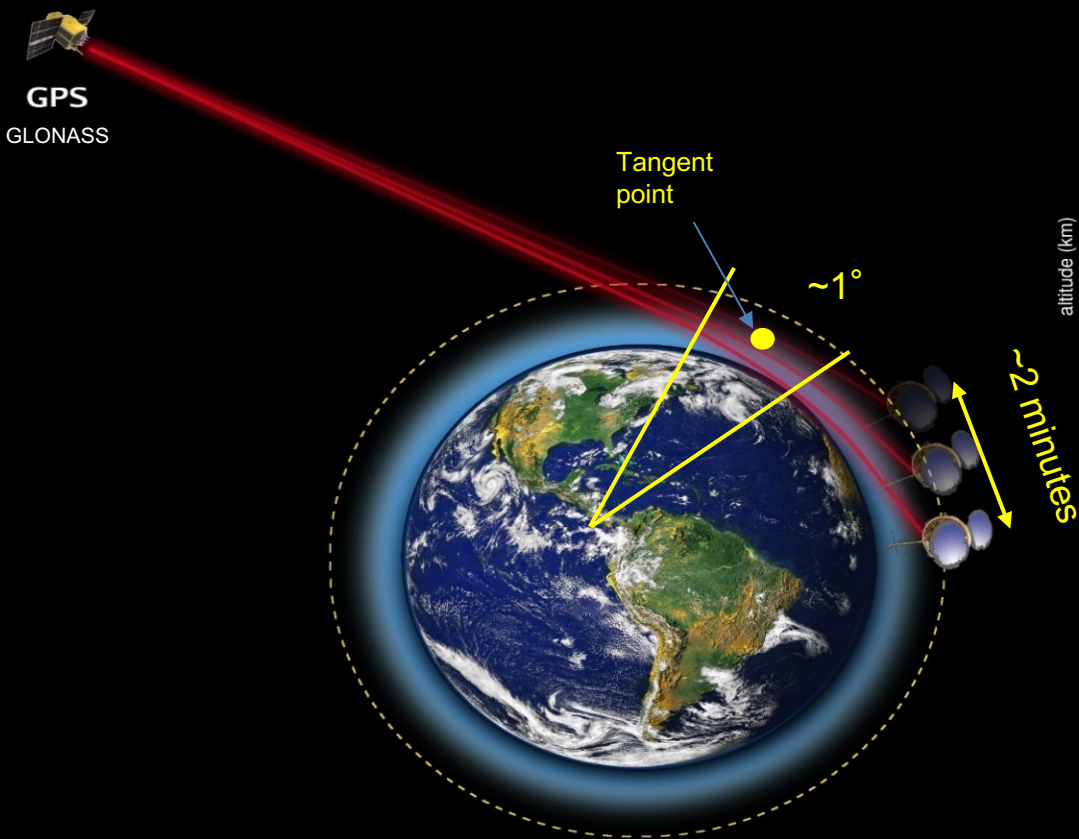
Cosmic-1 Profiles in 24 hour period (April 29, 2007)



COSMIC-2 – How does it work?



Radio Occultation





Radio Occultation History



Mariner 4 Mars flyby
first occultation - 1965



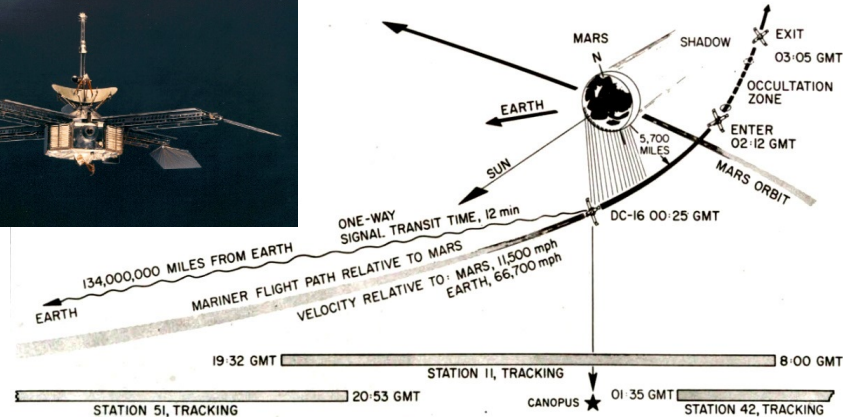
GPS/MET – Earth Radio Occultations
Proof of concept - 1995



CHAMP – 2001 / SAC-C - 2004



COSMIC-1 – April 2006



e.g., CHAMP



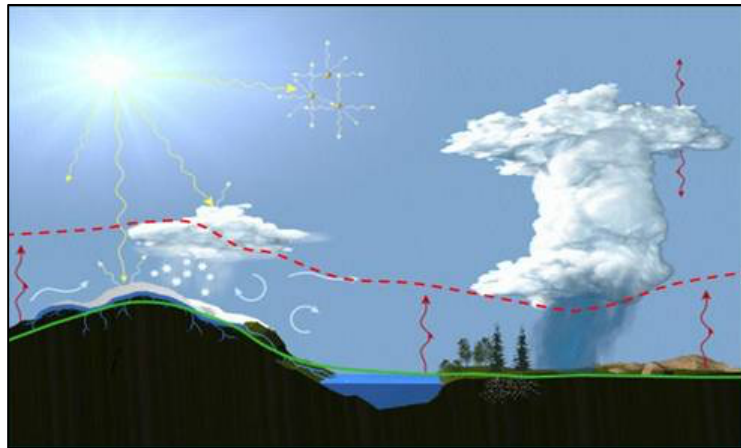


COSMIC-2 – Why is NASA interested in this mission?

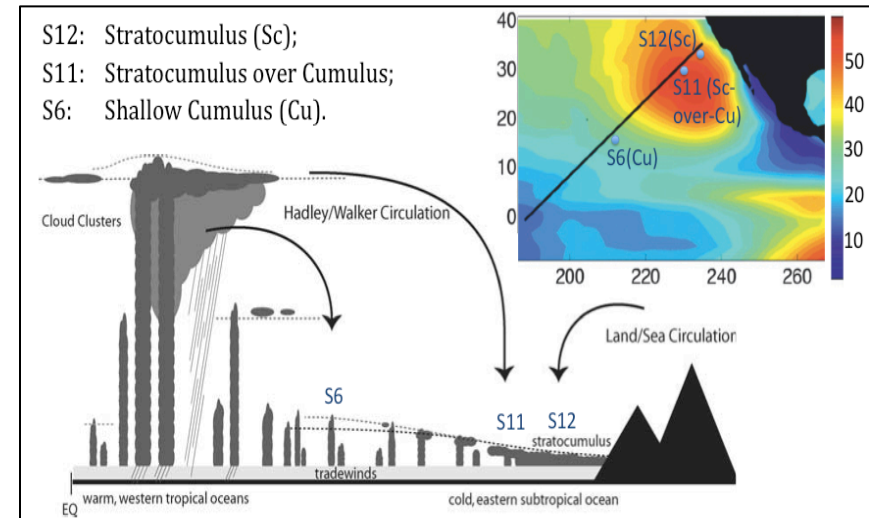


- Radio occultations penetrate clouds and can measure the atmosphere both above and below the clouds; vital to our understanding of weather and climate changes

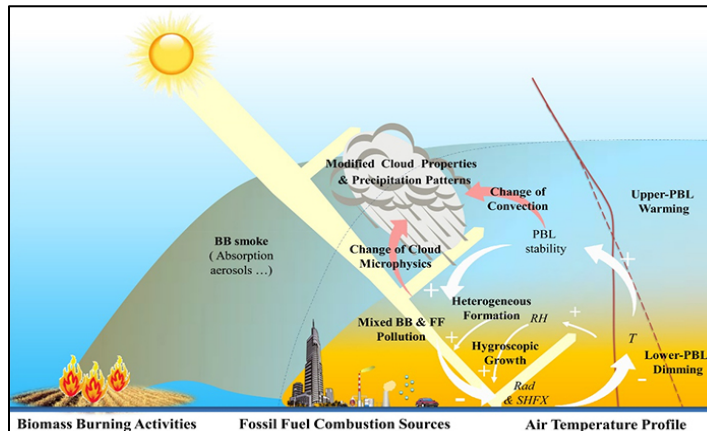
Weather, Clouds, Storms



Cloud-Climate Feedback

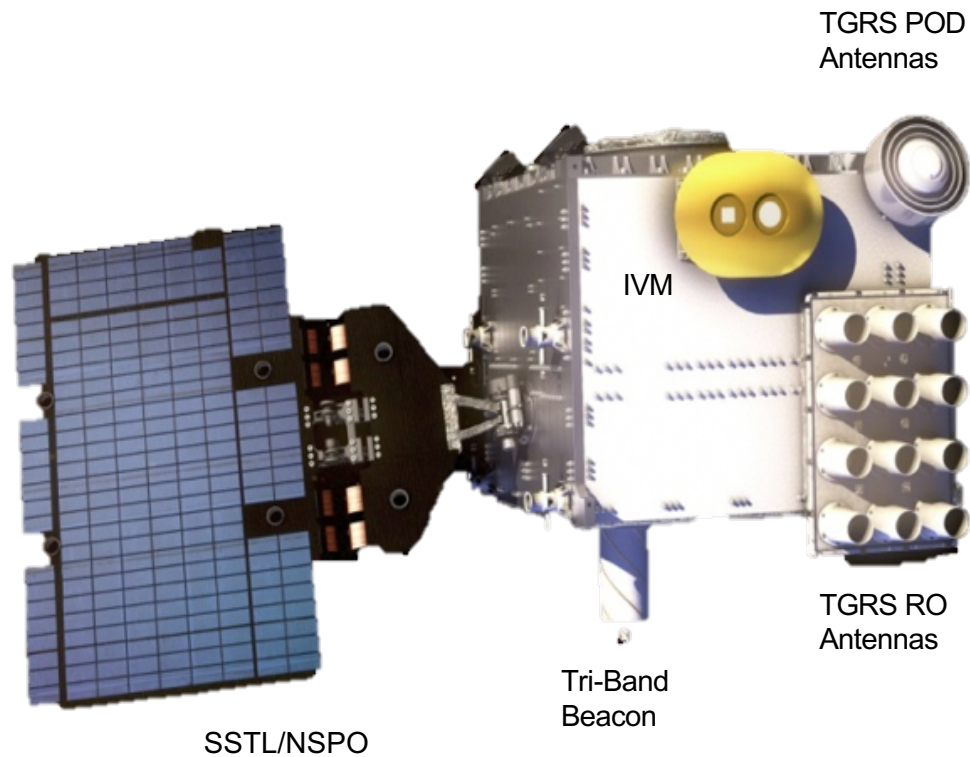


AQ & Trace Gas Fluxes





COSMIC-2 Spacecraft

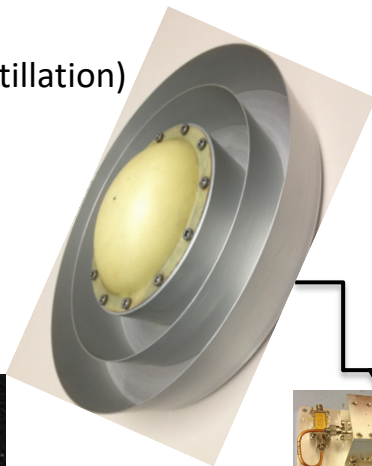




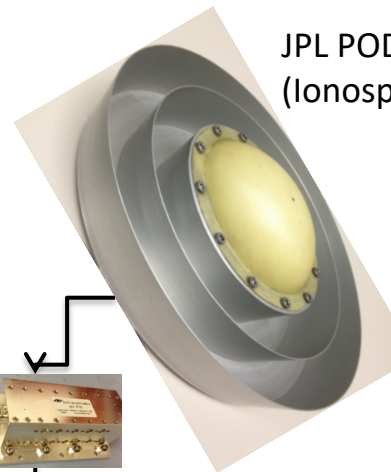
TGRS (TriG GNSS Receiver System) COSMIC-2 Primary Mission Payload



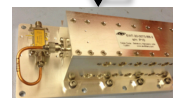
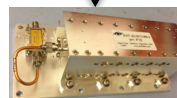
JPL POD Antenna Fore
(Ionosphere Arc/RO/Scintillation)



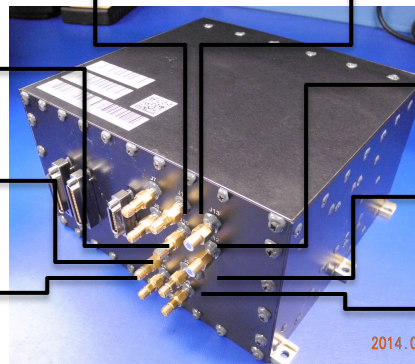
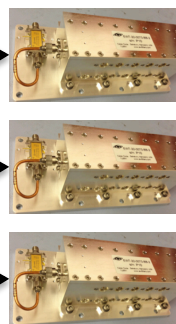
JPL POD Antenna Aft
(Ionosphere Arc/RO/Scintillation)



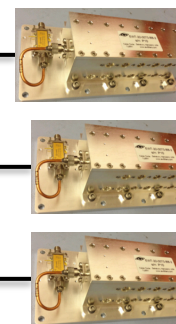
JPL RO Beamforming Antenna Fore
(Neutral Atmosphere RO)



JPL Filter/LNA
Assemblies (8)



TriG GNSS Receiver



JPL RO Beamforming Antenna Aft
(Neutral Atmosphere RO)



COSMIC-2 Satellites at Launch Site



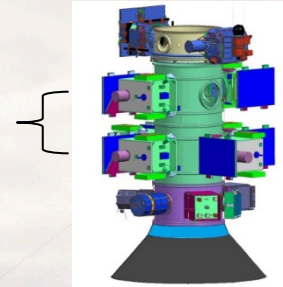
NSPO



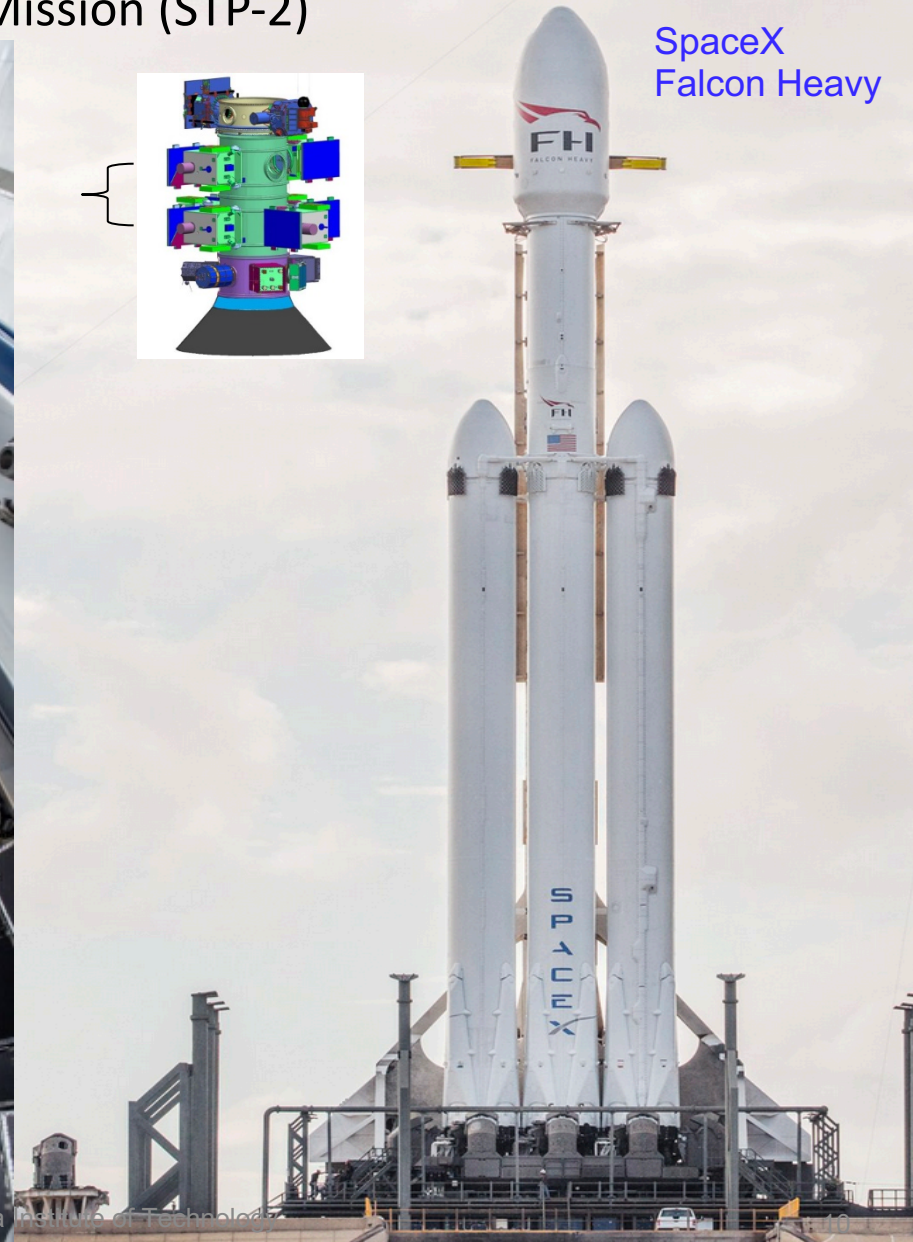
STP-2 Launch



- COSMIC-2 in USAF Space Test Program-2 Mission (STP-2)

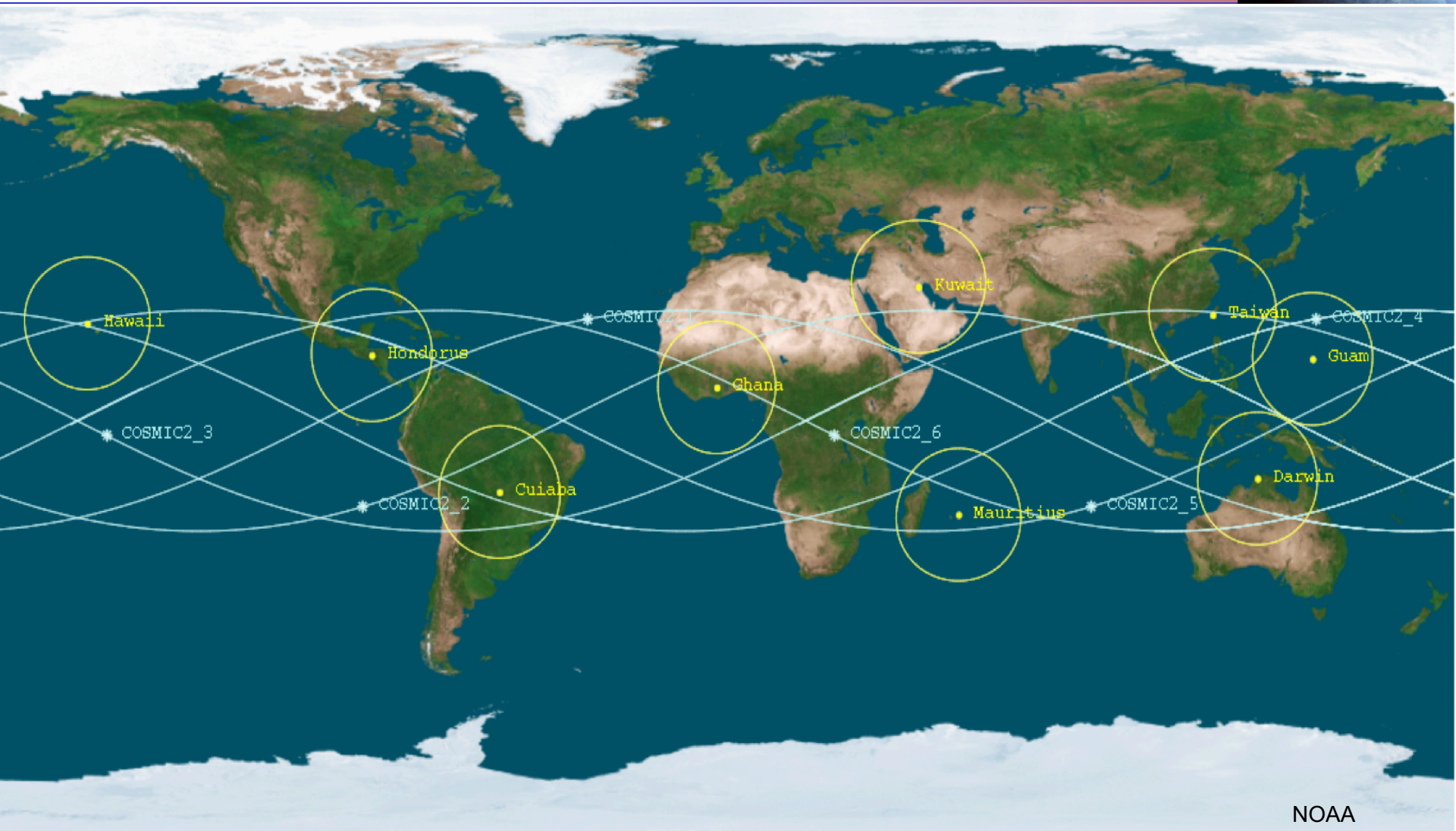


SpaceX
Falcon Heavy





Ground Antenna Locations



NOAA

- Uplink Stations: Taiwan and Darwin



Summary



- COSMIC-2 will provide significantly more data and will be assimilated directly into weather models
- With the better signals, COSMIC-2 will see down to the bottom half mile or so of the atmosphere (Planetary Boundary Layer), where the weather we experience takes place



Back-Up

